

VIA FACSIMILE TRANSMISSION 571-273-8300

Docket No. 135271 (553-1040)
PATENTIN THE CLAIMS

1. (Currently Amended) A sub-aperture transceiver system to be housed in an ultrasound probe, the system comprising:

a probe housing;

a signal processor located in the probe housing;

receive signal connections coupling the signal processor to a receive sub-aperture comprising acoustic transceiver elements;

transmit signal connections coupled to a transmit sub-aperture comprising at least one acoustic transceiver element joined to multiplexing circuitry to multiplex the acoustic transceiver element between the transmit and receive sub-apertures, the signal processor performing beamforming on the receive sub-aperture to produce a receive sub-aperture signal; and

a receive sub-aperture output driven by the signal processor for carrying the receive sub-aperture signal from the probe housing.

2. (Previously Presented) The system of claim 1, where the receive sub-aperture is a triangular sub-aperture.

3. (Previously Presented) The system of claim 1, where the transmit sub-aperture is square.

4. (Previously Presented) The system of claim 1, where the receive sub-aperture comprises at least two uneven rows of acoustic transceiver elements.

5. (Previously Presented) The system of claim 1, where the receive signal connections couple the signal processor to a plurality of receive sub-apertures.

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6. (Previously Presented) The system of claim 1, where the transmit signal connections couple the signal processor to a plurality of transmit sub-apertures.

7. (Previously Presented) The system of claim 6, where the receive sub-apertures are triangular receive sub-apertures.

8. (Previously Presented) The system of claim 1, further comprising a plurality of signal processors coupled to a corresponding plurality of receive sub-apertures, each of the signal processors performing beamforming for the corresponding receive sub-aperture.

9. (Previously Presented) The system of claim 8, where the receive signal connections further couple each signal processor to the corresponding receive sub-apertures, the receive sub-apertures collectively forming a receive aperture.

10. (Currently Amended) A sub-aperture transceiver system comprising:

a first processing board having a data input to receive first setup data;

a second processing ~~board~~ joined serially in a chained arrangement with the first processing board, the second processing board having a data input to receive second setup data; and

receive signal connections for a plurality of receive sub-apertures distributed between the first and second processing boards, the first and second processing boards producing first and second receive data, respectively, based upon first and second setup data, the first and second setup data being propagated serially between the first processing board and the second processing board;

where the receive signal connections couple each receive sub-aperture to at least one of the first and second processing boards without partitioning any receive sub-aperture between the first and second processing boards.

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11. (Previously Presented) The system of claim 10, further comprising:

transmit signal connections for a plurality of transmit sub-apertures distributed between the first and second processing boards,

where the transmit signal connections couple each transmit sub-aperture to at least one of the processing boards without partitioning any transmit sub-aperture between the processing boards.

12. (Previously Presented) The system of claim 10, further comprising:

transmit signal connections for a plurality of transmit sub-apertures distributed between the first and second processing boards,

where at least one transmit sub-aperture comprises a transducer element multiplexed between at least one receive sub-aperture.

13. (Currently Amended) The system of claim 10, further comprising a first cable bearing selected ones of the receive signal connections to the first processing board and a second cable bearing selected ones of the receive signal connections to the second processing board.

14. (Currently Amended) The system of claim 13, where the first and second cables are flex cables.

15. (Currently Amended) The system of claim 13, where the first cable comprises selected ones of the receive signal connections for a first transducer array line.

16. (Previously Presented) The system of claim 10, further comprising a first signal processor on the first processing board and a second signal processor on the second processing board.

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17. (Previously Presented) The system of claim 16, where the first signal processor is coupled to a first plurality of receive sub-apertures through the receive signal connections and where the second signal processor is coupled to a second plurality of receive sub-apertures through the receive signal connections.

18. (Previously Presented) The system of claim 10, where the receive sub-apertures are triangular receive sub-apertures.

19. (Previously Presented) The system of claim 12, where the transmit sub-apertures are square transmit sub-apertures.

20. (Previously Presented) The system of claim 10, where the first and second processing boards are disposed in an ultrasound probe.

21. (Previously Presented) A method in an ultrasound system for sub-aperture processing, the method comprising:

performing sub-aperture beamforming, at a signal processor located in an ultrasound probe, based on a plurality of receive signals received from acoustic transducer elements that form a receive sub-aperture;

multiplexing, within the ultrasound probe, at least one of the acoustic transducer elements between the receive sub-aperture and a transmit sub-aperture; and

driving a receive sub-aperture output by the signal processor with a receive sub-aperture signal obtained over the acoustic transducer elements in the receive sub-aperture.

22. (Previously Presented) The method of claim 21, where the receive sub-aperture is a triangular sub-aperture.

23. (Previously Presented) The method of claim 21, where the transmit sub-aperture is square.

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24. (Currently Amended) A method in an ultrasound system for sub-aperture processing, the method comprising:

receiving, for a plurality of receive sub-apertures, receive signals distributed to a first signal processor on a first processing board and a second signal processor on a second processing board without partitioning any of the receive sub-apertures between the processing boards;

multiplexing, within the ultrasound probe, at least one of the acoustic transducer elements between ~~the-a~~ receive sub-aperture and a transmit sub-aperture; and

driving a receive sub-aperture output by the first signal processor with a receive sub-aperture signal obtained over the acoustic transducer elements in the receive sub-aperture.

25. (Previously Presented) A method in an ultrasound system for sub-aperture processing, the method comprising:

receiving, at a signal processor located in an ultrasound probe, a plurality of receive signals from acoustic transducer elements that comprise a receive sub-aperture;

multiplexing, within the ultrasound probe, at least one of the acoustic transducer elements between the receive sub-aperture and a transmit sub-aperture;

driving a receive sub-aperture output coupled to the signal processor with a signal obtained over the acoustic transducer elements in the receive sub-aperture;

coupling transmit signals to a plurality of transmit apertures over transmit signal connections distributed between the first and second processing boards, and

where the transmit signal connections couple each transmit sub-aperture to at least one of the processing boards without partitioning any of the transmit sub-apertures between the processing boards.

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26. (Previously Presented) The system of claim 10, further comprising a controller connected over digital signal lines to the first and second processing boards, the controller passing at least one of static and dynamic setup information as the first and second setup data to the first and second processing boards.

27. (Previously Presented) The system of claim 10, wherein the first and second setup data include dynamic setup information that varies from receive beam to receive beam.

28. (Previously Presented) The system of claim 10, further comprising memory storing the first and second setup data organized into pages, where each page stores beam directional setup information associated with a complete scan sequence.

29. (Previously Presented) The system of claim 1, wherein the multiplexing circuitry includes a receive signal blocking circuit coupled to the transmit signal connections to block the receive sub-aperture signal.

30. (Previously Presented) The system of claim 1, wherein the multiplexing circuitry includes a transmit signal blocking circuit connected to the receive signal connections to block transmit signals.

31. (Previously Presented) The system of claim 1, wherein the multiplexing circuitry includes a diode arrangement coupled to the transmit signal connections to block the receive sub-aperture signal.

32. (Previously Presented) The system of claim 1, wherein the multiplexing circuitry includes a diode arrangement connected to the receive signal connections to block transmit signals.